

(c) DNA sequences which on expression code for a polypeptide coded for on expression by any of the foregoing DNA sequences and inserts.

38. The recombinant DNA molecule according to claim 37, wherein said DNA sequence (b) which hybridizes to said DNA insert (a) is selected from the group consisting of the hybridizing portion of each of:

HchrIF-A, the subcloned HindIII fragment of chr 3 in E.coli HB101;

HchrIF-B, the subcloned EcoRI fragment of chr 12 in E.coli HB101;

HchrIF-C, the subcloned HindIII fragment of chr 12 in E.coli HB101;

HchrIF-D, the subcloned EcoRI fragment of chr 13 in E.coli HB101;

HchrIF-E, the subcloned EcoRI fragment of chr 23 in E.coli HB101;

HchrIF-F, the subcloned HindIII fragment of chr 23 in E.coli HB101;

HchrIF-G, the subcloned EcoRI fragment of chr 26 in E.coli HB101; and

HchrIF-H, the subcloned HindIII fragment of chr 26 in E.coli HB101.

39. The recombinant DNA molecule according to claim 3 comprising a DNA sequence selected from the group consisting of DNA sequences of the formula:

ATGGCCTGCCCTTGCTTACTGATGGCCTGGTGGTGCTCAGCTGCAAGTCAAGC
TGCTCTCTGGGCTGTGATCTCCCTGAGACCCCACAGCCTGGATAACAGGGAGGACCTTG
ATGCTCCTGGCACAAATGAGCAGAATCTCTCCTCCTGTCTGATGGACAGACAT

GA CTTGGATTCCCCAGGAGGAGTTGATGGCAACCAGTCCAGAAGGCTCCAGCC
ATCTCTGCCTCCATGAGCTGATCCAGCAGATCTCAACCTCTTACCAAAAGAT
TCATCTGCTGCTGGATGAGGACCTCTAGACAAATTCTGCACCGAACTCTACAG
CAGCTGAATGACTTGAAGCCTGTGTGATGCAGGAGGAGAGGGTGGAGAAACTCCC
CTGATGAATGCGGACTCCATCTGGCTGTGAAGAAATACTTCCGAAGAACATCACTCTC
TATCTGACAGAGAAGAAATACAGCCCTGTGCCTGGAGGTTGTCAGAGCAGAAATC
ATGAGATCCCTCTTTATCAACAAACTTGCAAGAAAGATTAAGGAGGAAGGAA

and

TGTGATCTCCCTGAGACCCACAGCCTGGATAACAGGAGGACCTTGATGCTCCTGGCA
CAAATGAGCAGAACTCTCCTCCTCCTGTCTGATGGACAGACATGACTTTGGATTT
CCCCAGGAGGAGTTGATGGCAACCAGTTCCAGAAGGCTCCAGCCATCTGTCTC
CATGAGCTGATCCAGCAGATCTCAACCTTTACCAAAAGATTCATCTGCTGCT
TGGGATGAGGACCTCCTAGACAAATTCTGCACCGAACTCTACCAGCAGCTGAATGAC
TTGGAAGCCTGTGTGATGCAGGAGGAGAGGGTGGAGAAACTCCCTGATGAATGCG
GACTCCATCTGGCTGTGAAGAAATACTTCCGAAGAACATCACTCTATCTGACAGAG
AAGAAATAACAGCCCTGTGCCTGGAGGTTGTCAGAGCAGAAATCATGAGATCCCTC
TCTTTATCAACAAACTTGCAAGAAAGATTAAGGAGGAAGGAA.

40. The recombinant DNA molecule according to
claim 37 comprising a DNA sequence selected from the group
consisting of DNA sequences of the formula:

TTACTGGTGGCCCTCCTGGTGTCAAGCTGCAAGTCAAGCTGCTCTGTGGCTGTGAT
CTGCCCTCAAACCCACAGCCTGGTAGCAGGAGGACCTTGATGCTCCTGGCACAGATG
AGGAGAAATCTCTCTTCTCCTGCTTGAAGGACAGACATGACTTTGGATTTCCCCAG
GAGGAGTTGGCAACCAGTCCAAAAGGCTGAAACCATCCCTGTCTCCATGAGATG
ATCCAGCAGATCTCAATCTTCAAGCACAAGGACTCATCTGCTGCTGGATGAG
ACCCTCCTAGACAAATTCTACACTGAACCTACAGCAGCTGAATGACCTGGAAAGCC
TGTGTGATACAGGGGTGGGGTGACAGAGACTCCCTGATGAAGGAGGACTCCATT
CTGGCTGTGAGGAAATACTTCCAAAGAACATCACTCTATCTGAAAGAGAAGAAATAC
AGCCCTTGTGCCTGGAGGTTGTCAGAGCAGAAATCATGAGATCTTTCTTGTCA
ACAAACTTGCAAGAAAGTTAAGAAGTAAGGAA and

TGTGATCTGCCTCAAACCCACAGCCTGGTAGCAGGAGGACCTTGATGCTCCTGGCA
CAGATGAGGAGAATCTCTTTCTCCTGTTGAAGGACAGACATGACTTTGGATT
CCCCAGGAGGAGTTGGCAACCAGTCCAAAAGGCTGAAACCACATCCCTGTCCTCCAT
GAGATGATCCAGCAGATCTCAATCTTCAGCACAAAGGACTCATCTGCTGCTTGG
GATGAGACCCCTCCTAGACAAATTCTACACTGAACTCTACCAGCAGCTGAATGACCTG
GAAGCCTGTGTGATAACAGGGGTGGGGTGACAGAGACTCCCCTGATGAAGGAGGAC
TCCATTCTGGCTGTGAGGAAATCTTCAAAGAACATCACTCTCTATCTGAAAGAGAAG
AAATACAGCCCTGTGCCTGGAGGTTGTCAGAGCAGAAATCATGAGATCTTTCT
TTGTCAACAAACTTCAAGAAAGTTAAGAAGTAAGGAA

41. The recombinant DNA molecule according to
claim 37 comprising a DNA sequence selected from the group
consisting of DNA sequences of the formula:

ATGGCCCTGTCTTTCTTACTGATGCCGTGCTGGTGCTCAGCTACAAATCCATC
TGTTCTCTGGCTGTGATCTGCCTCAGACCCACAGCCTGGTAATAGGAGGACCTTG
ATACTCCTGCAACAAATGGGAAGAACATCTCTCATTCTCCTGCCTGAAGGACAGACAT
GATTTCGGATTCCCCGAGGAGGAGTTGATGCCACCAAGTTCCAGAACAGACTCAAGCC
ATCTCTGTCCTCCATGAGATGATCCAGCAGACCTTCAATCTTCAGCACAGAGGAC
TCATCTGCTGCTGGAACAGAGCCTCTAGAAAAATTTCACGAACTTTACCAAG
CAACTGAATGACCTGGAAGCATGTGTGATAACAGGAGGTTGGGTGGAAGAGACTCCC
CTGATGAATGTGGACTCCATCCTGGCTGTGAGGAAATCTTCAAAGAACATCTT
TATCTAACAGAGAAGAAATACAGCCCTGTGCCTGGAGGTTGTCAGAGCAGAAATC
ATGAGATCCCTCTGTTCAACAAACTGCAAAAAGATTAAGGAGGAAGGAT

and

TGTGATCTGCCTCAGACCCACAGCCTGGTAATAGGAGGACCTTGATACCTGC
CAAATGGGAAGAACATCTCTCATTCTCCTGCCTGAAGGACAGACATGATTCGGATT
CCCGAGGAGGAGTTGATGCCACCAAGTTCCAGAACAGACTCAAGCCATCTGTCCTC
CATGAGATGATCCAGCAGACCTTCAATCTTCAGCACAGAGGACTCATCTGCTG
TGGGAACAGAGCCTCTAGAAAAATTTCACGAACTTTACAGCAACTGAATGAC
CTGGAAAGCATGTGTGATAACAGGAGGTTGGGTGGAAGAGACTCCCCTGATGAATGT
GACTCCATCCTGGCTGTGAGGAAATCTTCAAAGAACATCACTTTATCTAACAGAG

AAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCCCTC
TCGTTTCAACAAACTTGCAAAAAAGATTAAGGAGGAAGGAT.

42. The recombinant DNA molecule according to claim 37, wherein said DNA sequence is operatively linked to an expression control sequence.

43. The recombinant DNA molecule according to claim 42, wherein said expression control sequence controls the expression of genes of prokaryotic or eukaryotic cells and their viruses.

44. The recombinant DNA molecule according to claim 43, wherein said expression control sequence is selected from the group consisting of a lac system, a β -lac system, a trp system, major operator and promotor regions of phage λ , and the control region of fd coat protein.

45. The recombinant DNA molecule according to claim 37 selected from the group consisting of C8-IFN- α 1, C8-IFN- α 2, LAC-AUG(α 2) and β -lac-AUG(α 2).

46. A host cell transformed with at least one recombinant DNA molecule according to claim 37.

47. The host cell of claim 46 selected from the group consisting of bacteria, yeasts, mouse or other animal hosts, and human tissue cells.

48. The transformed host cell according to
claim 46 selected from the group consisting of E.coli
HB101(Z-pBR322(Pst)/HcIF-II-206) and E.coli HB101 (Z-
pBR322(Pst)/HcIF-SN35-AHL6).

49. The transformed host cell according to
claim 46 selected from the group consisting of HchrIF-A,
wherein HchrIF-A is the subcloned HindIII fragment of
chr 3 in E.coli HB101; HchrIF-B, wherein HchrIF-B is the
subcloned EcoRI fragment of chr 12 in E.coli HB101;
HchrIF-C, wherein HchrIF-C is the subcloned HindIII
fragment of chr 12 in E.coli HB101; HchrIF-D, wherein
HchrIF-D is the subcloned EcoRI fragment of chr 13 in
E.coli HB101; HchrIF-E, wherein HchrIF-E is the subcloned
EcoRI fragment of chr 23 in E.coli HB101; HchrIF-F,
wherein HchrIF-F is the subcloned HindIII fragment of
chr 23 in E.coli HB101; HchrIF-G, wherein HchrIF-G is the
subcloned EcoRI fragment of chr 26 in E.coli HB101;
HchrIF-H, wherein HchrIF-H is the subcloned HindIII
fragment of chr 26 in E.coli HB101; HchrIF-I, wherein
HchrIF-I is the subcloned HindIII/BamHI fragment of chr 35
in E.coli HB101; and HchrIF-J, wherein HchrIF-J is the
subcloned BamHI fragment of chr 35 in E.coli HB101.

50. The transformed host cell according to
claim 46 selected from the group consisting of E.coli
DS410 (C8-IFN- α 1), E.coli DS410 (C8-IFN- α 2), E.coli DS410
(LAC-AUG(α 2)), E.coli DS410 HB101 (Blac-AUG(α 2)) and Mouse
3T3 (polyoma-Hif-chr35).

51. A method for producing a recombinant DNA molecule comprising the step of introducing into a cloning vehicle a DNA sequence selected from the group consisting of

(a) the DNA inserts of Z-pBR322(Pst)/HcIF-II-206 and Z-pBR322(Pst)/HcIF-SN35-AHL6,

(b) DNA sequences which hybridize to any of the foregoing DNA inserts and which code for a polypeptide of the IFN- α type and

(c) DNA sequences which on expression code for a polypeptide coded for on expression by any of the foregoing DNA sequences and inserts.

52. The method according to claim 51 comprising the additional step of introducing into said cloning vehicle an expression control sequence so as to permit expression of said DNA sequence.

53. A DNA sequence coding for an α -type interferon selected from the group consisting of DNA sequences of the formula:

ATGGCCTGCCCTTGCTTTACTGATGGCCTGGTGGTGCAGCTGCAAGTCAGC
TGCTCTCTGGCTGTGATCTCCCTGAGACCCACAGCCTGGATAACAGGAGGACCTTG
ATGCTCCTGGCACAAATGAGCAGAATCTCTCCTCCTGTCTGATGGACAGACAT
GACTTTGGATTCCCCCAGGAGGAGTTGATGGCAACCAGTTCCAGAAGGCTCCAGCC
ATCTCTGTCCTCCATGAGCTGATCCAGCAGATCTTCAACCTCTTACCAAAAGAT
TCATCTGCTGCTGGGATGAGGACCTCCTAGACAATTCTGCACCGAACTCTACCG
CAGCTGAATGACTTGGAAAGCCTGTGTGATGCAGGAGGAGAGGGTGGAGAAACTCCC
CTGATGAATGCCGACTCCATCTTGGCTGTGAAGAAACTTCCGAAGAATCACTCTC
TATCTGACAGAGAAGAAATACAGCCCTGTGCCTGGAGGTTGTCAGAGCAGAAATC
ATGAGATCCCTCTTTATCAACAAACTTGCAGAAAGATTAAGGAGGAAGGAA

and

TGTGATCTCCCTGAGACCCACAGCCTGGATAACAGGAGGACCTGATGCTCCTGGCA
CAAATGAGCAGAATCTCTCCTCCTCGTCTGATGGACAGACATGACTTTGGATTT
CCCCAGGAGGAGTTGATGCCAACAGTCCAGAAGGCTCCAGCCATCTCTGCCTC
CATGAGCTGATCCAGCAGATCTCAACCTCTTACCAAAAGATTCATCTGCTGCT
TGGGATGAGGACCTCCTAGACAAATTCTGCACCGAACTCTACCAGCAGCTGAATGAC
TTGGAAGCCTGTTGATGCAGGAGGAGAGGGTGGGAGAAACTCCCCTGATGAATGCG
GACTCCATCTGGCTGTGAAGAAATACTTCCGAAGAATCACTCTATCTGACAGAG
AAGAAATAACAGCCCTGTGCCTGGAGGTTGTCAGAGCAGAAATCATGAGATCCCTC
TCTTTATCAACAAACTTGCAAGAAAGATTAAGGAGGAAGGAA.

54. A DNA sequence coding for an α -type interferon selected from the group consisting of DNA sequences of the formula:

TTACTGGTGGCCCTCCTGGTGTCAAGCTGCAAGTCAAGCTGCTCTGTGGGCTGTGAT
CTGCCTCAAACCCACAGCCTGGTAGCAGGAGGACCTGATGCTCCTGGCACAGATG
AGGAGAAATCTCTCTTCTCCTGCTGAAGGACAGACATGACTTTGGATTCCCCAG
GAGGAGTTGGCAACCAGTCCAAAAGGCTGAAACCATCCCTGCTCCTCCATGAGATG
ATCCAGCAGATCTCAATCTTCAGCACAAAGGACTCATCTGCTGCTTGGATGAG
ACCCTCCTAGACAAATTCTACACTGAACCTACCAAGCAGCTGAATGACCTGGAAGCC
TGTGTGATACAGGGGGTGGGGGTGACAGAGACTCCCCTGATGAAGGAGGACTCCATT
CTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTATCTGAAAGAGAAGAAATAC
AGCCCTTGTGCCTGGAGGTTGTCAGAGCAGAAATCATGAGATCTTTCTTGTCA
ACAAACTTGCAAGAAAGTTAAGAAGTAAGGAA and
TGTGATCTGCCTCAAACCCACAGCCTGGTAGCAGGAGGACCTGATGCTCCTGGCA
CAGATGAGGAGAAATCTCTCTTCTCCTGCTGAAGGACAGACATGACTTTGGATTT
CCCCAGGAGGAGTTGGCAACCAGTCCAAAAGGCTGAAACCATCCCTGCTCCTCCAT
GAGATGATCCAGCAGATCTCAATCTTCAGCACAAAGGACTCATCTGCTGCTTGG
GATGAGACCCCTCTAGACAAATTCTACACTGAACCTACCAAGCAGCTGAATGACCTG
GAAGCCTGTGTGATACAGGGGGTGGGGGTGACAGAGACTCCCCTGATGAAGGAGGAC
TCCATTCTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTATCTGAAAGAGAAG

AAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCTTTCT
TTGTCAACAAACTGCAAGAAAGTTAAGAAGTAAGGAA

55. A DNA sequence coding for an α -type interferon selected from the group consisting of DNA sequences of the formula:

ATGCCCTGCTTTCTTACTGATGCCGTGCTGGTGCCTCAGCTACAAATCCATC
TGGTCTCTGGCTGTGATCTGCCTCAGACCCACAGCCTGGTAATAGGAGGACCTTG
ATACTCCTGCAACAAATGGGAAGAACATCTCTCATTCTCCTGCCTGAAGGACAGACAT
GATTCGGATTCCCCGAGGAGGAGTTGATGCCACCAGTCCAGAAGACTCAAGCC
ATCTCTGCTCCATGAGATGATCCAGCAGACCTCAATCTTCAGCACAGAGGAC
TCATCTGCTGCTGGAACAGAGCCTCCTAGAAAAATTCCACTGAACCTTACAG
CAACTGAATGACCTGGAAGCATGTGTGATAACAGGAGGTTGGGTGGAAGAGACTCCC
CTGATGAATGTGGACTCCATCCTGGCTGTGAGGAAATACTTCAAAGAACATCACTCTT
TATCTAACAGAGAAGAACATACAGCCCTTGTGCCTGGAGGTTGTCAGAGCAGAAATC
ATGAGATCCCTCTGTTCAACAAACTTGCAAAAAGATTAAGGAGGAAGGAT

and

TGTGATCTGCCTCAGACCCACAGCCTGGTAATAGGAGGACCTTGATACTCCTGCAA
CAAATGGGAAGAACATCTCTCATTCTCCTGCCTGAAGGACAGACATGATTCGGATTC
CCCGAGGAGGAGTTGATGCCACCAGTCCAGAAGACTCAAGCCATCTGCTCCT
CATGAGATGATCCAGCAGACCTCAATCTTCAGCACAGAGGACTCATCTGCTGCT
TGGGAACAGAGCCTCCTAGAAAAATTCCACTGAACCTTACAGCAACTGAATGAC
CTGGAAGCATGTGTGATAACAGGAGGTTGGGTGGAAGAGACTCCCTGATGAATGTG
GACTCCATCCTGGCTGTGAGGAAATACTTCAAAGAACATCACTTTATCTAACAGAG
AAGAACATACAGCCCTTGTGCCTGGAGGTTGTCAGAGCAGAAATCATGAGATCCCTC
TCGTTTCAACAAACTTGCAAAAAGATTAAGGAGGAAGGAT.

REMARKS

This application is a Rule 60 divisional
application of pending application Serial No. 06/223,108